

## Education

- 2020–Present PhD in Aerospace Engineering Sciences (Autonomous Systems)  
Advised by Zachary Sunberg and Morteza Lahijanian  
University of Colorado Boulder
- 2020–2023 M.S. in Aerospace Engineering Sciences (Autonomous Systems)
- 2015–2019 B.Eng Mechanical Engineering (Honours with Distinction)  
National University of Singapore

## Appointments

- 2020–Present Graduate Research Assistant, Autonomous Systems, University of Colorado Boulder
- 2019 Research Engineer, Autonomy Group, Singapore-MIT Alliance for Research and Technology (SMART) Centre
- 2018 Singapore-MIT Undergraduate Research Fellow, SMART Centre
- 2017 Research and Development Intern, Sivantos Group

## Research Projects

- 2020–Present **Fast Planning under Uncertainty for Complex Tasks**  
*PI: Zachary Sunberg and Morteza Lahijanian*
- Sampling-based planning algorithms for Gaussian POMDPs and Non-deterministic Hybrid Systems.
  - Algorithms for cost and temporal logic Constrained POMDPs.
  - Planning with temporal logics (Linear Temporal Logic, Signal Temporal Logic).
- 2019–2019 **Multi-Target Tracking for Maneuvering Vehicles**  
*PI: Daniela Rus and Marcelo H. Ang. Jr.*  
Singapore-MIT Alliance for Research and Technology Centre
- Designed multi-object detection, estimation and tracking framework for multiple maneuvering vehicles using Interactive Multiple Models.
- 2018–2021 **Behavior, Context and Intention Aware Planning under Uncertainty for Urban Driving**  
*PI: Marcelo H. Ang Jr., Daniela Rus, David Hsu, Malika Meghiani*  
Bachelor of Engineering Dissertation, Dept. of Mechanical Engineering, National University of Singapore
- Worked on sampling-based online POMDP planning under uncertainty.
  - Developed driver behaviour inference algorithms for self-driving car POMDP planning.
  - Developed a novel context and intention-based state transition model.
  - Validated algorithms on a self-driving car on public roads.
- 2018 **Singapore-MIT Undergraduate Research Fellowship: Technologies of Autonomy**  
*PI: Daniela Rus, Singapore-MIT Alliance for Research and Technology*

- Developed mobile robot utilising vision-based SLAM for navigation in crowded spaces.
- Implemented CNN-based object detection for socially aware navigation.

2018      **String stability of vehicle platoons**

*PI: Johan Lofberg, Linköping University*

- Developed prototypes and validated various control strategies.

2017      **Nanosatellite Development - Galassia 2**

*PI: Luo Sha*

Innovation and Design Centric Programme, National University of Singapore

- Helped in development of remote agricultural imaging 3U Cubesat, Galassia 2 (launched in 2023)
- Worked on satellite attitude control and determination system using reaction wheels, developed crop health image processing methods.

## Selected Honors and Awards

2023	Young NUS Fellow - NUS Development Grant
2023	CU Boulder Graduate School Student Travel Grant
2020	Dean's Graduate Assistantship
2020	AES Departmental Fellowship
2019	NUS 33rd Annual Faculty of Engineering Innovation and Research Award - Silver
2018	Singapore-MIT Undergraduate Research Fellowship
2018	NUS Awards for Studying Abroad - NASA Exchange Scholarship

## Publications

### Preprints/Under Review (\* denotes equal contribution)

1. **Qi Heng Ho\***, Tyler Becker\*, Benjamin Kraske, Zakariya Laouar, Martin Feather, Federico Rossi, Zachary Sunberg, and Morteza Lahijanian, "Recursively-Constrained Partially Observable Markov Decision Processes". (Under Review)
2. **Qi Heng Ho**, Zachary Sunberg, and Morteza Lahijanian, "Sampling-based Reactive Synthesis for Nondeterministic Hybrid Systems". (Under Review)
3. Zakariya Laouar, Rayan Mazouz, Tyler Becker, **Qi Heng Ho**, and Zachary Sunberg, "Safe Feasibility-Guided MPC for Stochastic Hybrid Systems". (Under Review)

### Peer Reviewed Publications (\* denotes equal contribution)

1. **Qi Heng Ho**, Zachary Sunberg, and Morteza Lahijanian. "Planning with SiMBA: Motion Planning under Uncertainty for Temporal Goals using Simplified Belief Guides". In IEEE Int. Conf. on Robotics and Automation (**ICRA**), 2023.
2. Anne Theurkauf, **Qi Heng Ho**, Roland Ilyes, Nisar Ahmed, and Morteza Lahijanian. "Chance-Constrained Motion Planning with Event-Triggered Estimation". In IEEE Int. Conf. on Robotics and Automation (**ICRA**), 2023.

3. Roland Ilyes, **Qi Heng Ho**, and Morteza Lahijanian. "Stochastic Robustness Interval for Motion Planning with Signal Temporal Logic". In IEEE Int. Conf. on Robotics and Automation (**ICRA**), 2023.
4. **Qi Heng Ho**, Roland Ilyes, Zachary Sunberg, and Morteza Lahijanian. 2023. Poster Abstract: Sampling-based Approach to Robust STL Synthesis for Complex Systems under Uncertainty. In Proceedings of the 26th ACM International Conference on Hybrid Systems: Computation and Control (HSCC), 2023.
5. **Qi Heng Ho**, Roland Ilyes, Zachary Sunberg, and Morteza Lahijanian. "Automaton-Guided Control Synthesis for Signal Temporal Logic Specifications". In IEEE Conference on Decision and Control (**CDC**), 2022.
6. **Qi Heng Ho**, Zachary Sunberg, and Morteza Lahijanian, "Gaussian Belief Trees for Chance Constrained Asymptotically Optimal Motion Planning". In IEEE Int. Conf. on Robotics and Automation (**ICRA**), 2022.
7. Yuanfu Luo\*, Malika Meghjani\*, **Qi Heng Ho\***, David Hsu, Daniela Rus. "Interactive Planning for Autonomous Urban Driving in Adversarial Scenarios". In IEEE Int. Conf. on Robotics and Automation (**ICRA**), 2021.
8. Hongliang Guo, Zefan Huang, **Qi Heng Ho**, Marcelo Ang, and Daniela Rus. "Autonomous Navigation in Dynamic Environments with Multi-Modal Perception Uncertainties". In IEEE Int. Conf. on Robotics and Automation (**ICRA**), 2021.
9. Malika Meghjani, Yuanfu Luo, **Qi Heng Ho**, Panpan Cai, Shashwat Verma, Daniela Rus, and David Hsu. "Context and Intention Aware Planning for Urban Driving". In IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (**IROS**), 2019.
10. Malika Meghjani, Shashwat Verma, You Hong Eng, **Qi Heng Ho**, Daniela Rus and Marcelo H. Ang Jr. "Context-Aware Intention and Trajectory Prediction for Urban Driving Environment". In IFRR Int. Symposium on Experimental Robotics (**ISER**), 2018.

## Lightly Reviewed Publications

1. **Qi Heng Ho**, Zachary Sunberg, and Morteza Lahijanian, "Gaussian Belief Trees for Probabilistic Signal Temporal Logic Planning", Robotics Science and Systems (RSS) Workshop on Risk Aware Decision Making: From Optimal Control to Reinforcement Learning, 2022.

## Service

Organizer	RSS 2023 Workshop on Inference and Decision Making for Autonomous Vehicles (IDMAV)
Reviewer	CDC, IROS, ICRA, RA-L, AAAI FSS

## Extracurricular

2022-2023	Mentor for High School Student <ul style="list-style-type: none"> <li>• Mentored a Boulder Valley High School student on a high school research project</li> </ul>
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